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No.

8600131



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'PHG47'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 30th day of January in the year of our Lord one thousand nine hundred and eighty-seven.

Attest:

*Kenneth H. Evans*  
Commissioner

Plant Variety Protection Office  
Agricultural Marketing Service

Todd Piper  
App. No. 10/769,212  
Secretary of Agriculture

REF  
A14

| U.S. DEPARTMENT OF AGRICULTURE<br>AGRICULTURAL MARKETING SERVICE  |                              | APPROVAL EXPIRES 4-30-88   |
|---|------------------------------|--|
| <b>APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE</b><br>(Instructions on reverse)  |                              | FORM APPROVED: OMB NO. 0681-0065<br>Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2428). |
| 1. NAME OF APPLICANT(S)   | 2. TEMPORARY DESIGNATION     | 3. VARIETY NAME  |
| Pioneer Hi-Bred International, Inc.   |                              | PHG47  |
| 4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code)  | 5. PHONE (Include area code) | FOR OFFICIAL USE ONLY  |
| Plant Breeding Division<br>Department of Corn Breeding<br>PO Box 85, Johnston, IA 50131-0085  | 515/270-3300                 | PVPO NUMBER  |
|   |                              | 8600131  |
| 6. GENUS AND SPECIES NAME   | 7. FAMILY NAME (Botanical)   | FILING   |
| Zea mays  | Gramineae                    | DATE <u>June 5, 1986</u><br>TIME <u>12:30</u> <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.   |
| 8. KIND NAME  | 9. DATE OF DETERMINATION     | AMOUNT FOR FILING  |
| Corn  | 1981                         | \$ <u>1800.</u>  |
| 10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)   |                              | DATE <u>June 5, 1986</u><br>AMOUNT FOR CERTIFICATE   |
| Corporation   |                              | \$ <u>200.00</u>   |
| 11. IF INCORPORATED, GIVE STATE OF INCORPORATION  |                              | DATE <u>January 2, 1987</u>  |
| Iowa  |                              | 12. DATE OF INCORPORATION<br>May 6, 1926   |
| 13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS  |                              |  |
| Dr. Richard L. McConnell<br>Plant Breeding Division<br>Pioneer Hi-Bred International, Inc.<br>PO Box 85<br>Johnston, IA 50131-0085  |                              |  |
|   |                              | PHONE (Include area code): 515/270-3363  |
| 14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED   |                              |  |
| a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)<br>b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement.<br>c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)<br>d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety.<br>e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership. |                              |  |
| 15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.)   |                              |  |
| <input type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input checked="" type="checkbox"/> No  |                              |  |
| 16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?   |                              | 17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?  |
| <input type="checkbox"/> Yes <input type="checkbox"/> No  |                              | <input type="checkbox"/> Foundation <input type="checkbox"/> Registered <input type="checkbox"/> Certified   |
| 18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?   |                              |  |
| <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No   |                              |  |
| 19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?   |                              |  |
| <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No   |                              |  |
| 20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.   |                              |  |
| The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.   |                              |  |
| Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.  |                              |  |
| SIGNATURE OF APPLICANT  |                              | DATE   |
| Pioneer Hi-Bred International, Inc.   |                              |  |
| SIGNATURE OF APPLICANT by:  |                              | DATE   |
| <u>Richard L. McConnell</u>   |                              | June 3, 1986   |

C O R N

8600131

'PHG47'

14A. Exhibit A. Origin and Breeding History

Pedigree: 041/MKSDTE)3221112

Pioneer line PHG47, Zea mays L., a yellow dent corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross 041 x MKSDTE C10 using the pedigree method of breeding. The inbred line 041 is a proprietary inbred line of Pioneer Hi-Bred International, Inc. MKSDTE C10 is a broad-based breeding population that had 10 cycles of recurrent selection prior to the time of crossing to 041 to begin the development of PHG47. Selfing and selection were practiced within the above cross for seven generations during the development of PHG47. The inbred line was developed at Mankato, Minnesota, with the F4 generation being grown at Homestead, Florida. During line development, the line was crossed to inbred testers for the purpose of estimating combining ability. Additional hybrid combinations have been evaluated and subsequent generations of the line were grown and hand pollinated with observations made for uniformity.

PHG47 has shown uniformity and stability for all traits as described in Exhibit C (form LPGS-470-28) - "Objective Description of Variety". PHG47 has been self-pollinated and ear-rowed a sufficient number of generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or are expected in PHG47.

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14B. Exhibit B. Novelty Statement for 'PHG47'

PHG47 is most similar to the public inbred line OH43. PHG47 expresses earlier maturity and has faster grain drydown than does OH43. PHG47 reaches 50% silk emergence at 1360 heat units versus 1420 heat units for OH43. PHG47 also has a smaller and harder textured ear type than does OH43.

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION  
BELTSVILLE, MARYLAND 20705

FORM APPROVED: OMB NO. 40-R3822

EXHIBIT C  
(Corn)

OBJECTIVE DESCRIPTION OF VARIETY  
CORN (ZEA MAYS)

|  |  |
|--|--|
| NAME OF APPLICANT(S)<br>Pioneer Hi-Bred International, Inc.  | FOR OFFICIAL USE ONLY                          |
| ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)<br>Plant Breeding Division<br>Department of Corn Breeding<br>P. O. Box 85<br>Johnston, IA 50131-0085 | PVPO NUMBER<br>8600131                         |
|  | VARIETY NAME OR TEMPORARY DESIGNATION<br>PHG47 |

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (e.g., 089 or 09) when number is either 99 or less or 9 or less.

1. TYPE:

2

1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNAMENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

2

1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST  
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

6 4

DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK

(Under "comments" (pg. 3) state how heat units were calculated)

1 3 6 0

HEAT UNITS

DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY

HEAT UNITS

DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE

HEAT UNITS

4. PLANT:

1 7 2

CM. HEIGHT (To tassel tip)

0 4 1

CM. EAR HEIGHT (To base of top ear)

0 8

CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

1

1 = NONE 2 = 1-2 3 = 2-3 4 = > 3

Number of Ears Per Stalk:

2

1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY  
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

1

1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify)

5. LEAF (Field Corn Inbred Examples Given):

Color:

2

1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY DARK GREEN (K166)

Angle from Stalk (Upper half):

1

1 = < 30° 2 = 30-60° 3 = > 60°

Sheath Pubescence:

1

1 = LIGHT (W22) 2 = MEDIUM (WF9)  
3 = HEAVY (OH26)

Marginal Waves:

1

1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L)

Longitudinal Creases:

1

1 = ABSENT (OH51) 2 = FEW (OH56A)  
3 = MANY (PA11)

Width:

0 9

CM. WIDEST POINT OF EAR NODE LEAF

Length:

0 6 5

CM. EAR NODE LEAF

1 7

NUMBER OF LEAVES PER MATURE PLANT

## 6. TASSEL:

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  NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

 1 = < 30°    2 = 30-40°    3 = > 45°

Penduncle Length:

  CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

 1 = LIGHT (WF9)    2 = MEDIUM    3 = HEAVY (KY21)

 Anther Color:    1 = YELLOW    2 = PINK    3 = RED    4 = PURPLE    5 = GREEN  
 Glume Color:    6 = OTHER (Specify) \_\_\_\_\_

Pollen Restoration for Cytoplasms (0 = Not Tested, 1 = Partial, 2 = Good)

 "T"     "S"     "C"    ☐ OTHER (Specify Cytoplasm and degrees of restoration) \_\_\_\_\_

## 7. EAR (Husked Ear Data Except When Stated Otherwise):

  CM LENGTH      MM. MID-POINT DIAMETER       GM. WEIGHT

Kernel Rows:

 1 = INDISTINCT    2 = DISTINCT      NUMBER

 1 = STRAIGHT    2 = SLIGHTLY CURVED    3 = SPIRAL

Silk Color (Exposed at Silking Stage):

 1 = GREEN    2 = PINK    3 = SALMON    4 = RED

Husk Color:

 FRESH    1 = LIGHT GREEN    2 = DARK GREEN    3 = PINK  
 DRY    4 = RED    5 = PURPLE    6 = BUFF

Husk Extension: (Harvest Stage)

 1 = SHORT (Ears Exposed)    2 = MEDIUM (Barely Covering Ear)  
 3 = LONG (8-10CM Beyond Ear Tip)  
 4 = VERY LONG (> 10 CM)

Husk Leaf:

 1 = SHORT (< 8 CM)    2 = MEDIUM (8-15 CM)  
 3 = LONG (> 15 CM)

Shank:

  CM LONG     NO. OF INTERNODES

Position at Dry Husk Stage:

 1 = UPRIGHT    2 = HORIZONTAL    3 = PENDENT

Taper:

 1 = SLIGHT    2 = AVERAGE    3 = EXTREME

Drying Time (Unhusked Ear):

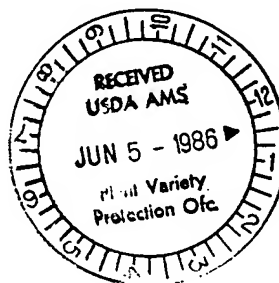
☐ 1 = SLOW    2 = AVERAGE    3 = FAST

## 8. KERNEL (Dried):

Size (From Ear Mid-Point):

  MM LONG      MM. WIDE      MM. THICK

Shape Grade (% Rounds)

 1 = < 20    2 = 20-40    3 = 40-60    4 = 60-80    5 = > 80


## 8. KERNEL (Dried):

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☐ 1 Pericarp Color: 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE  
 5 = BROWN 6 = LIGHT RED 7 = CHERRY RED  
 8 = VARIEGATED (Describe) \_\_\_\_\_

☐ 1 Aleurone Color: 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) \_\_\_\_\_

☐ 3 1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED  
 7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) \_\_\_\_\_

☐ 3 Endosperm Color: 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:

☐ 3 1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH  
 5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) \_\_\_\_\_

☐ 2 ☐ 1 GM. WEIGHT /100 SEEDS (Unsize Sample)

## 9. COB:

☐ 2 ☐ 2 MM. DIAMETER AT MID-POINT

Strength: ☐ 2 1 = WEAK 2 = STRONG

Color: ☐ 1 1 = WHITE 2 = PINK 3 = RED 4 = BROWN  
5 = VARIEGATED 6 OTHER (Specify) \_\_\_\_\_

10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = ~~Resistant~~ Tolerant):

|  |   |   |
|--|---|---|
| <input type="checkbox"/> 1 STALK ROT (Diplodia)          | <input type="checkbox"/> 1 STALK ROT (Fusarium) | <input type="checkbox"/> 1 STALK ROT (Gibberella)     |
| <input type="checkbox"/> 1 NORTHERN LEAF BLIGHT          | <input type="checkbox"/> 1 SOUTHERN LEAF BLIGHT | <input type="checkbox"/> 1 SMUT (Common)              |
| <input type="checkbox"/> 0 SOUTHERN RUST                 | <input type="checkbox"/> 2 CORN SMUT (Head)     | <input type="checkbox"/> 1 BACTERIAL WILT (Stewart's) |
| <input type="checkbox"/> 1 BACTERIAL LEAF BLIGHT (Goss') | <input type="checkbox"/> 0 MAIZE DWARF MOSAIC   | <input type="checkbox"/> 0 STUNT                      |
| <input type="checkbox"/> OTHER (Specify) _____           |   |   |

11. INSECT RESISTANT (0 = Not Tested, 1 = Susceptible, 2 = ~~Resistant~~ Tolerant):

|  |  |                                      |                                  |
|--|--|--------------------------------------|----------------------------------|
| <input type="checkbox"/> 1 CORNBORER           | <input type="checkbox"/> 0 EARWORM             | <input type="checkbox"/> 0 SAPBEETLE | <input type="checkbox"/> 2 APHID |
| <input type="checkbox"/> 0 ROOTWORM (Northern) | <input type="checkbox"/> 1 ROOTWORM (Western)  |                                      |                                  |
| <input type="checkbox"/> 0 ROOTWORM (Southern) | <input type="checkbox"/> OTHER (Specify) _____ |                                      |                                  |

## 12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

| CHARACTER  | VARIETY | CHARACTER        | VARIETY |
|------------|---------|------------------|---------|
| Maturity   | PHG29   | Kernel Type      | OH43    |
| Plant Type | OH43    | Quality (Edible) | NA      |
| Ear Type   | OH43    | Usage            | OH43    |

## REFERENCES:

- U.S. Department Agriculture. Yearbook 1937.
- Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous Authors)
- Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize, Cornell A.E.S., Mem. 180. 1935.
- The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.
- Stringfield, G.H. Maize Inbred Lines of Ohio, Ohio A.E.S. Bul. 831. 1959.
- Butler, D.R. 1954 - A System for the Classification of Corn Inbred Lines - PhD. Thesis, Ohio State University.

## COMMENTS: Heat units are accumulated from daily temperatures as follows:

HI = Maximum air temperature in Fahrenheit, but not greater than 86.  
 LO = Minimum air temperature in Fahrenheit, but not less than 50.  
 Heat Units = (HI + LO)/2 - 50, but not less than 0.



## 14D. Exhibit D. Additional Description of 'PHG47'

PHG47 is a yellow dent inbred line of corn, Zea mays L.

As an inbred per se, PHG47 is similar to the public inbred line OH43. However, there are some distinguishable differences between these two inbreds as stated in Exhibit B.

For maturity, PHG47 is similar to PHG29. When compared to PHG29 crossed to the same tester lines and evaluated at the same locations, PHG47 is 6% lower yielding, 2% dryer at harvest, has 8% poorer stalk quality, has 2% better root quality, is 15% poorer for late season plant health, is 13% better on cob strength, and is 4% shorter and 8% lower eared than PHG29.

For comparative purposes, data are attached with comparisons of PHG47 to Pioneer inbred line PHG29 (crossed to the same tester line and evaluated in the same locations).

14D. Exhibit D. Comparison of PHG47 and PHG29 crossed to the same tester lines and the hybrids evaluated at the same locations. All values are expressed as percent of the test mean except yield, which is expressed as bushels/acre adjusted to 15.5% moisture.

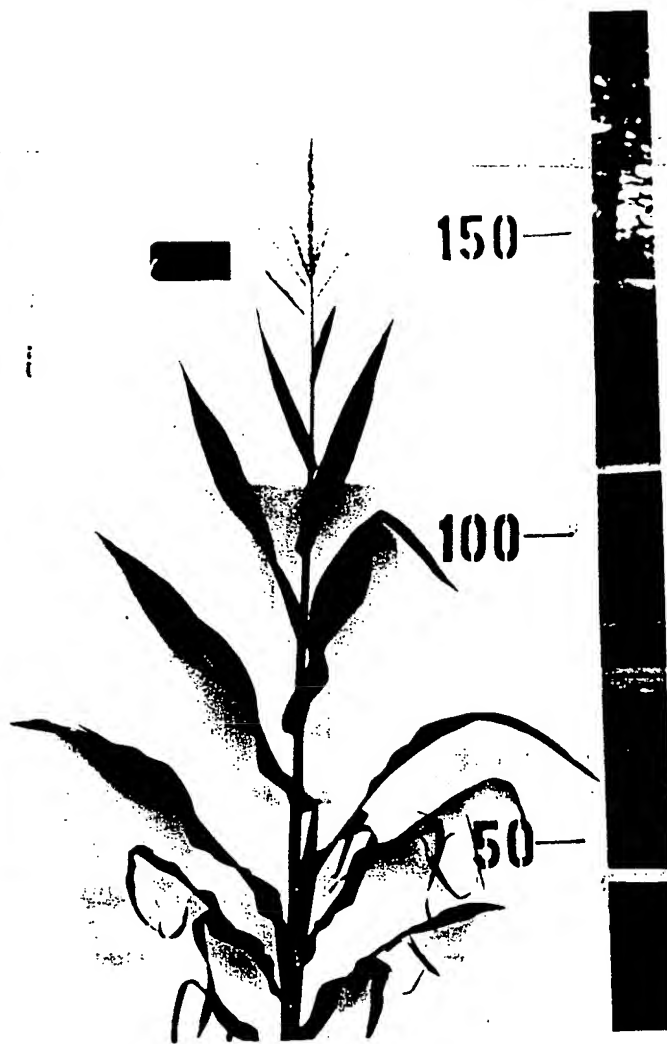
|              | Inbred | Yield | Percent Yield | Moisture | GDU Shed | Stalk Lodging | Root Lodging | Ears/Plot | Stay Green | Test Weight | Grain Quality | Cob Scores | Seedling Vigor | Plant Height | Ear Height |  |
|--------------|--------|-------|---------------|----------|----------|---------------|--------------|-----------|------------|-------------|---------------|------------|----------------|--------------|------------|--|
| No. of Reps. |        | 59    | 59            | 59       | 11       | 59            | 22           | 9         | 22         | 59          |               | 3          | 40             | 38           | 38         |  |
|              | PHG47  | 128   | 92            | 98       | 99       | 88            | 104          | 101       | 72         | 100         | No            | 87         | 97             | 98           | 94         |  |
|              | PHG29  | 136   | 98            | 100      | 100      | 96            | 102          | 100       | 87         | 99          | Data          | 74         | 98             | 102          | 102        |  |
| Diff.        |        | 8     | 6             | 2        | 1        | 8             | 2            | 1         | 15         | 1           |               | 13         | 1              | 4            | 8          |  |

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14D. Exhibit D. Additional Description of 'PHG47' (continued)

a. Whole plant



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14D. Exhibit D. Additional Description of 'PHG47' (continued)

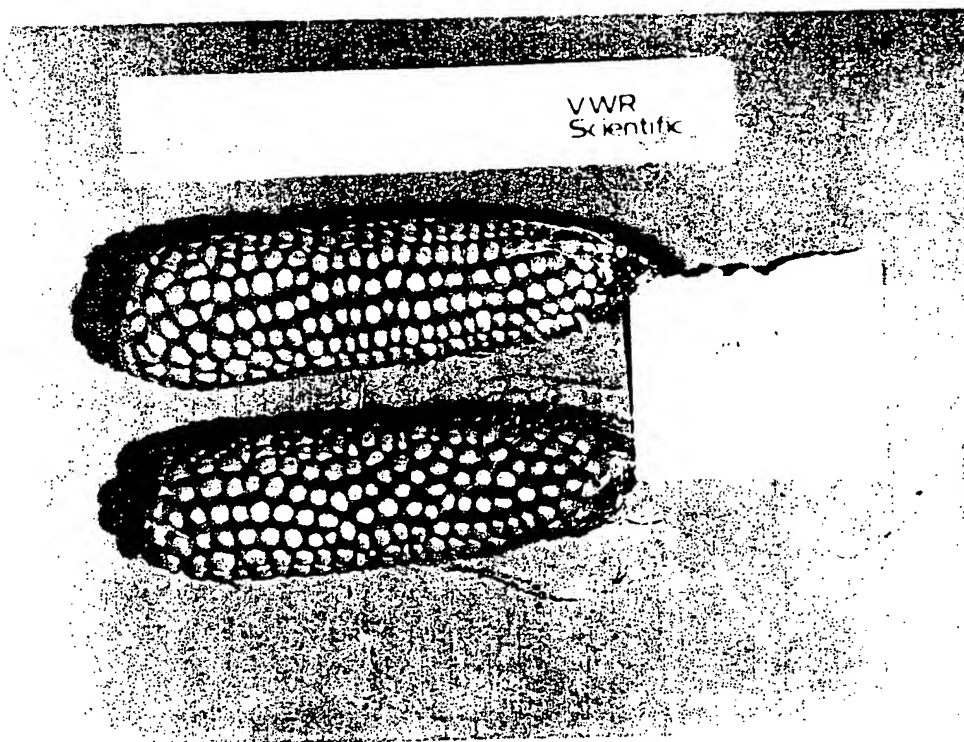
b. Tassel



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14D. Exhibit D. Additional Description of 'PHG47' (continued)

c. Ear



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14E. Exhibit E. Statement of Basis of Applicant's Ownership  
of 'PHG47'

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the selection and development of PHG47. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of PHG47.